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10/650,409	08/27/2003	Xiadong Mao	SONYP028	6558

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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/650,409	MAO, XIADONG	
	Examiner	Art Unit	
	Jason R. Kurr	2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 August 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *7-13 and 25-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *7-13 and 25-39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 7-13 and 25-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oh et al (US 5,353,376) in view of Brandstein et al (US 5,581,620) and in further view of Varma et al (US 2004/0213419 A1).

With respect to claim 7, Oh discloses a method for reducing noise associated with an audio signal received through a microphone sensor array (fig.1 #10), comprising: detecting a target signal component and a noise signal component from at least two microphones (col.3 ln.3-5); enhancing the target signal component of the audio signal through a first filter (fig.1 #16,18,20 "DS-BF", col.3 ln.48-63); blocking the target signal component through a second filter (fig.1 #22,24,26 "ANC", col.4 ln.5-10); combining (fig.1 #28) an output of the first filter and an output of the second filter so that noise signal component is reduced without distorting the target signal (col.4 ln.10-15); and calibrating a value of the second filter based upon an acoustic set-up (col.4 ln.49-53).

Oh does not disclose expressly wherein an acoustic set-up associated with the audio signal is periodically monitored for the purpose of calibrating the first and second

filter values so as to actively update tracking and steering toward the target signal component. The beamforming of Oh does not account for a moving source or target signal (col.2 ln.64-68, col.3 ln.1-3)*, therefor the calibration of beamformer coefficient values is not disclosed by Oh.

Brandstein discloses an adaptive beamforming system that accounts for a moving target source of audio, such as a speaker (col.3 ln.24-26)(col.3 ln.53-67, col.4 ln.1-11), wherein filter values (fig.1 #32) are periodically calibrated so as to actively update tracking and steering toward the target source of audio (col.14 ln.20-55).

At the time of the invention it would have been obvious to a person of ordinary skill in the art that the adaptive beamforming system of Brandstein could have been used as the beamformer in the invention of Oh.

The motivation for doing so would have been to account for a moving target source of audio, wherein the system updates the focus of the received audio signal so as to improve the signal to noise ratio in the desired direction. Such an improvement would allow for the desired audio signal to be non-stationary.

Oh does not disclose expressly wherein the method for reducing noise associated with an audio signal received through a microphone sensor array is meant to be established within a game controller during game play.

Varma discloses a noise reduction system for microphone arrays wherein the array lies within a video game controller (fig.1, pg.1 [0005]).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the system of Oh in a video game controller and console as taught by Varma.

The motivation for doing so would have been to increase the intelligibility of voice commands spoken by a user of a video game for the purpose of controlling a function of the video game. The noise reduction system would allow for a user to continue playing a game with voice commands even in the event of interfering background noises.

With respect to claim 8, Oh discloses the method of claim 7 further comprising: defining the target signal component and a noise signal component through second order statistics (col.3 ln.14-23).

With respect to claim 9, Oh discloses the method of claim 8, further comprising: separating the target signal component and the noise signal component; and determining a time delay associated with each microphone sensor of the microphone senor array (col.3 ln.48-63).

With respect to claim 10, Oh discloses the method of claim 7, wherein the method operation of combining the output of the first filter and the output of the second filter in a manner to reduce noise without distorting the target signal includes, aligning the output of the second filter (col.4 ln.16-22).

With respect to claim 11, Oh discloses the method of claim 7 in view of Brandstein, wherein the acoustic set-up refers to relative position of a user and the microphone sensor array (Brandstein: col.3 ln.53-67, col.4 ln.1-11).

With respect to claim 12, Oh discloses the method of claim 7 in view of Brandstein, however does not disclose expressly wherein the method operation of periodically monitoring an acoustic set-up associated with the audio signal includes occurs about every 100 milliseconds. Official Notice is taken that it is well known in the art to update filter parameters at significantly short time period so as to update the system with relevant data pertaining to constantly changing unknowns. At the time of the invention it would have been obvious to a person of ordinary skill in the art to update the beamformer of Brandstein about every 100 milliseconds. The motivation for doing so would have been to account for any movement of the desired sound or of the sounds associated with noise.

With respect to claim 13, Oh discloses the method of claim 7, wherein the method operation of calibrating both a value of the first filter and a value of the second filter based upon the acoustic set-up includes, applying a blind source separation scheme using second order statistics associated with the audio signal (col.4 ln.35-49).

With respect to claim 25, Oh discloses a system capable of isolating a target audio signal from multiple noise sources during active use, comprising: a computing device (fig.1 #14), the computing device including logic configured enhance the target audio signal (col.3 ln.64-68, col.4 ln.1-4); and a microphone array (fig.1 #10), the microphone array configured to capture audio signals.

Oh does not disclose expressly wherein a listening direction associated with the microphone array is controlled through the logic configured to enhance the target audio signal.

Brandstein discloses an adaptive beamforming system that accounts for a moving target source of audio, such as a speaker (col.3 ln.24-26)(col.3 ln.53-67, col.4 ln.1-11), wherein a microphone array is calibrated so as to actively update tracking and steering toward the target source of audio (col.14 ln.20-55).

At the time of the invention it would have been obvious to a person of ordinary skill in the art that the adaptive beamforming system of Brandstein could have been used as the beamformer in the invention of Oh.

The motivation for doing so would have been to account for a moving target source of audio, wherein the system updates the focus of the received audio signal so as to improve the signal to noise ratio in the desired direction. Such an improvement would allow for the desired audio signal to be non-stationary.

Oh does not disclose expressly wherein the system comprises a portable consumer device configured to move in positions that are independent from positions of a user during active use, so as to not constrain movement of the portable consumer device.

Varma discloses a noise reduction system for microphone arrays wherein the array lays within a portable consumer device, a video game controller (fig.1, pg.1 [0005]).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the system of Oh in a video game controller and console as taught by Varma.

The motivation for doing so would have been to increase the intelligibility of voice commands spoken by a user of a video game for the purpose of controlling a function of the video game. The noise reduction system would allow for a user to continue playing a game with voice commands even in the event of interfering background noises.

With respect to claim 26, Oh discloses the system of claim 25 in view of Varma, wherein the computing device (Varma: fig.3 #304) is in communication within the portable consumer device (Varma: fig.3 #300).

With respect to claim 27, Oh discloses the system of claim 26, wherein the computing device includes, the logic for enhancing the target signal that is executed by a first filter (fig.1 #16,18,20); logic for blocking the target signal through a second filter (fig.1 #22,24,26, col.4 ln.5-10); logic for combining the output of the first filter and the output of the second filter in a manner to reduce noise without distorting the target signal (fig.1 #28, col.4 ln.16-18); and logic for calibrating the second filter based upon the acoustic setup during active use of the system (col.4 ln.16-35).

Oh does not disclose expressly wherein the acoustic set up is monitored for calibrating the first filter.

Brandstein discloses an adaptive beamforming system wherein an acoustic set up is monitored (i.e. location of sound source) for the purpose of updating a filter (i.e. beamformer, fig.#14)(col.3 ln.24-26)(col.3 ln.53-67, col.4 ln.1-11), wherein filter values

(fig.1 #32) are periodically calibrated so as to actively update tracking and steering toward the target source of audio (col.14 ln.20-55).

At the time of the invention it would have been obvious to a person of ordinary skill in the art that the adaptive beamforming system of Brandstein could have been used as the beamformer in the invention of Oh.

The motivation for doing so would have been to account for a moving target source of audio, wherein the system updates the focus of the received audio signal so as to improve the signal to noise ratio in the desired direction. Such an improvement would allow for the desired audio signal to be non-stationary.

With respect to claim 28, Oh discloses the system of claim 25 in view of Brandstein, wherein the microphone array is configured in one of a convex geometry and a straight line geometry (Brandstein: col.3 ln.53-58).

With respect to claim 29, Oh discloses the system of claim 25 in view of Brandstein, wherein a distance between microphones of the microphone array is about 2.5 centimeters (Brandstein: col.3 ln.53-58).

With respect to claim 30, Oh discloses the system of claim 25 in view of Varma, wherein the portable consumer device is a video game controller and the computing device is a video game console (Varma: fig.1).

With respect to claim 31, Oh discloses a system for enhancing a target signal, comprising: a microphone array (fig.1 #10), the microphone array configured to detect an audio signal that includes a target audio signal and noise (col.1 ln.63-68, col.2 ln.1-

2); a computing system including circuitry configured to process the audio signal when received by the microphone array (fig.1 #14); wherein the filtering of the noise is achieved through a plurality of filter-and-sum operations (fig.2).

Oh does not disclose expressly wherein the microphone array is affixed to a video game controller.

Varma discloses a noise reduction system for microphone arrays wherein the array lies within a video game controller (fig.1, pg.1 [0005]).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the system of Oh in a video game controller and console as taught by Varma.

The motivation for doing so would have been to increase the intelligibility of voice commands spoken by a user of a video game for the purpose of controlling a function of the video game. The noise reduction system would allow for a user to continue playing a game with voice commands even in the event of interfering background noises.

Oh does not disclose expressly wherein the computing system includes filtering and enhancing logic that is periodically monitored and actively calibrated to filter noise and enhance the target audio signal's change in position during game play.

Brandstein discloses an adaptive beamforming system that accounts for a moving target source of audio, such as a speaker (col.3 ln.24-26)(col.3 ln.53-67, col.4 ln.1-11), wherein filter values (fig.1 #32) are periodically calibrated so as to actively update tracking and steering toward the target source of audio (col.14 ln.20-55).

At the time of the invention it would have been obvious to a person of ordinary skill in the art that the adaptive beamforming system of Brandstein could have been used as the beamformer in the invention of Oh.

The motivation for doing so would have been to account for a moving target source of audio relative to the microphone array, wherein the system updates the focus of the received audio signal so as to improve the signal to noise ratio in the desired direction. Such an improvement would allow for the desired source of the audio signal to be non-stationary.

With respect to claim 32, Oh discloses the video game controller of claim 31, wherein the filtering and enhancing logic includes separation filter logic configured to separate the target audio signal from the noise through a blind source separation scheme (col.4 ln.35-49).

With respect to claim 33, Oh discloses the video game controller of claim 32, wherein the blind source separation scheme is associated with a second order statistic derived from data corresponding to the audio signal (col.3 ln.14-23).

With respect to claim 34, Oh discloses the video game controller of claim 32, wherein the separation filter logic includes, adaptive array calibration logic to perform the periodic monitoring and calibration, the adaptive array calibration logic configured to calculate a separation filter value, the separation filter value capable of adjusting a listening direction associated with the microphone array (col.4 ln.16-53).

With respect to claim 35, Oh discloses a circuit, comprising: circuitry (fig.1 #14) configured to receive an audio signal from a microphone array (fig.1 #10) in a multiple noise source environment; circuitry configured to enhance a listening direction signal (fig.1 #16,18,20, col.3 ln.48-63); circuitry configured to block the listening direction signal (fig.1 #22,24,26, col.4 ln.5-10); circuitry configured to combine the enhanced listening direction signal and the blocked listening direction signal to yield a noise reduced signal (fig.1 #28, col.4 ln.16-18).

Oh does not disclose expressly wherein the circuitry is composed on an integrated circuit. Official Notice is taken that it is well known in the art that many basic electrical circuits may be implemented on an integrated circuit or chip. At the time of the invention it would have been obvious to a person of ordinary skill in the art to implement the circuitry (fig.1 #14) of Oh on an integrated circuit. The motivation for doing so would have been to decrease the size of the system of Oh. This would allow for the mounting of the circuit within small electronic devices.

Oh does not disclose expressly wherein the microphone array is installed on a game controller.

Varma discloses a noise reduction system for microphone arrays wherein the array lies within a video game controller (fig.1, pg.1 [0005]).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the system of Oh in a video game controller and console as taught by Varma.

The motivation for doing so would have been to increase the intelligibility of voice commands spoken by a user of a video game for the purpose of controlling a function of the video game. The noise reduction system would allow for a user to continue playing a game with voice commands even in the event of interfering background noises.

Oh does not disclose expressly wherein the circuit comprises circuitry configured to adjust a listening direction according to filters computed through an adaptive array calibration scheme.

Brandstein discloses an adaptive beamforming system that accounts for a moving target source of audio (col.3 ln.24-26)(col.3 ln.53-67, col.4 ln.1-11), wherein circuitry is configured to adjust a listening direction according to filters computed through an adaptive array calibration scheme.

At the time of the invention it would have been obvious to a person of ordinary skill in the art that the adaptive beamforming system of Brandstein could have been used as the beamformer in the invention of Oh.

The motivation for doing so would have been to account for a moving target source of audio relative to the microphone array, wherein the system updates the focus of the received audio signal so as to improve the signal to noise ratio in the desired direction. Such an improvement would allow for the desired source of the audio signal to be non-stationary.

With respect to claim 36, Oh discloses the integrated circuit of claim 35, wherein the adaptive array calibration scheme applies a second order statistic to data

associated with the audio signal to derive one of a signal passing filter and a blocking filter (col.3 ln.14-23).

With respect to claim 37, Oh discloses the integrated circuit of claim 35 in view of Brandstein, wherein the adaptive array calibration scheme is periodically invoked. It is implied that an adaptive system such the system provided by Brandstein periodically updated its' calibrations, hence "adaptive".

With respect to claim 38, Oh discloses the integrated circuit of claim 35, wherein the circuitry configured to combine the enhanced listening direction signal and the blocked listening direction signal to yield a noise reduced signal includes, circuitry configured to align the enhanced listening direction signal with the blocked listening direction signal (col.4 ln.16-22).

With respect to claim 39, Oh discloses the integrated circuit of claim 35, however does not disclose expressly wherein the integrated circuit is contained within one of a video game controller and a video game console.

Varma discloses a noise reduction system for voice applications wherein the electronic system is a video game controller and the computing device is a video game console (fig.1, pg.1 [0005]).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the system of Oh in a video game controller and console as taught by Varma.

The motivation for doing so would have been to increase the intelligibility of voice commands spoken by a user of a video game for the purpose of controlling a function of

the video game. The noise reduction system would allow for a user to continue playing a game with voice commands even in the event of interfering background noises.

Response to Arguments

Applicant's arguments with respect to claims 7-13 and 25-39 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Tashev (US 7,203,323 B2) discloses a system and process for calibrating a microphone array.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason R. Kurr whose telephone number is (571) 272-0552. The examiner can normally be reached on M-F 10:00am to 6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on (571) 273-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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